

# ScroungeMaster: Mobile, Pen-based Access to Laboratory Information in the Surgical Intensive Care Unit

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*ScroungeMaster provides an alternative to conventional access to laboratory information. A mobile, pen-based system with connection to at Stanford University Medical Center's (SUMC) main laboratory computer, the program retrieves selected patient lab data and stores them in a local database cache. Optimized for displaying information by physiologic system, the software uses a context-sensitive display algorithm to determine how lab information is presented. The goal of the project is to decrease access time and increase readability of lab information for the surgical resident.*

## Motivation

An estimated 40 percent of patient care decisions in the intensive care unit are guided by laboratory values and trends alone[1] and significant effort is required on the part of residents to review and manage this information. Observation of surgical housestaff at SUMC suggests that 30 to 45 minutes of computer time are required to examine the lab values for all patients on an ICU service, a task that must be performed several times a day.

## Architecture

Microsoft Windows for Pen Computing 1.01, Visual Basic 3.0, and Microsoft Access 2.0 were used to create the software. The mobile tablets computers are IBM 486-based ThinkPad 730Ts. An IBM PS/ValuePoint 486 DX2 computer is located on the hospital network to provide pre-caching of data in preparation for mobile unit lab requests. Mobile units are intermittently connected to the HIS using PCMCIA LAN cards and a wired 10-BaseT connection. Wireless Proxim RangeLAN II and Xircom networks have been tested and are under evaluation.

## Graphic User Interface

ScroungeMaster supports viewing of lab information by physiologic group, by graphing of lab data, or by displaying all of a patient's cached data in a single window at once. User preferences, patient medical condition, and previous viewing events are used to determine the user interface structure by a preference-heuristic layout algorithm. Display is prioritized towards showing information of direct importance to the selected patients care (Figure 1).

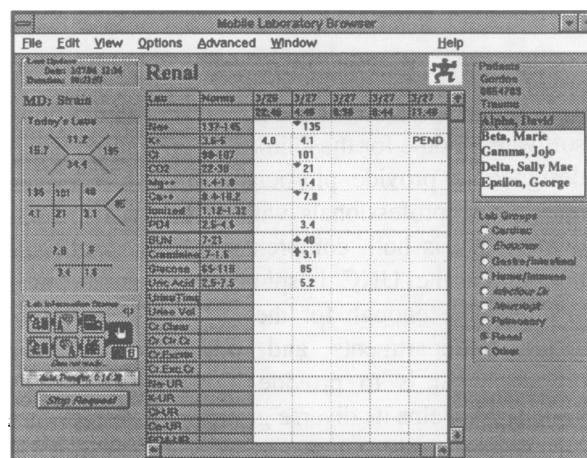


Figure 1. ScroungeMaster Physiologic Groups Display

## Performance

The surgical ICU service routinely follows 2-10 patients. In evaluating ScroungeMaster during 5 days of patient care use, lab retrievals for all patients on the surgical service (5 days of data/patient) required 2-7 minutes (ave.=4.3, SD=2.22). Approximately 9 seconds was required to switch between patients, and 0.5 seconds to move between physiologic grids. Most lab values could be found in one or two "taps" of the pen on the physiologic groups display.

## Discussion

The interface was described by surgical residents as useful in re-establishing the clinical context of what physiological problem had been last examined. Overall, the users believed that searches of lab information were simpler and more intuitive using the ScroungeMaster paradigm. Further evaluation is required to determine if this approach to mobile access is more efficient than traditional laboratory data access systems.

## References

1. Speicher, C.: Do duplicate chemistry profiles correlate with multiple physicians? Arch Pathol Lab Med 1988; 112: 235-236.

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